

WHAT IS CLAIMED IS:

1                   1.       A method for inspecting a semiconductor wafer comprising:  
2                   receiving defect information representative of plurality of defects on a  
3 semiconductor wafer;  
4                   taking a statistically-based sampling of said plurality of defects to produce a  
5 plurality of N sampled defects, N being a sample number; and  
6                   performing an inspection of each of said N sampled defects to produce  
7 summary information representative of results of said inspection of each of said N sampled  
8 defects.

1                   2.       The method of claim 1 further including receiving user-provided  
2 information comprising one or more statistical criteria, wherein said sample number N is a  
3 computed number resulting from one or more computations made based on said statistical  
4 criteria.

1                   3.       The method of claim 1 further including receiving user-provided  
2 information comprising one or more statistical criteria, wherein said sample number is  
3 produced by a table look-up of one or more data tables.

1                   4.       The method of claim 1 further including receiving user-provided  
2 information comprising one or more statistical criteria, wherein said sample number is  
3 produced by a combination of one or more computations made based on said statistical  
4 criteria and a table look-up of one or more data tables.

1                   5.       The method of claim 1 wherein said one or more statistical criteria  
2 comprise a reliability value and an allowable error value and said step of taking a  
3 statistically-based sampling includes randomly sampling N defects from said plurality of  
4 defects.

1                   6.       The method of claim 1 wherein said one or more statistical criteria  
2 comprise a reliability value and a dominant defect percentage value and said step of taking a  
3 statistically-based sampling includes randomly sampling N defects from said plurality of  
4 defects.

1                   7.       The method of claim 1 wherein said defect information is further  
2 representative of one or more clusters of said defects, said user-provided information further  
3 being representative of one of said one or more clusters, said step of sampling taking a  
4 statistically-based being performed on said one of said one or more clusters.

1                   8.       The method of claim 7 wherein said one or more clusters of said  
2 defects are classified based on density of defects.

1                   9.       The method of claim 1 wherein said step of receiving defect  
2 information includes performing a first inspection of said semiconductor wafer, said first  
3 inspection identifying the presence of a defect.

1                   10.      The method of claim 1 wherein said summary information includes  
2 first information indicative of clusters of said defects on said semiconductor wafer, second  
3 information indicative of a dominant defect in each of said clusters, and third information  
4 indicative of a distribution of different kinds of defects in each of said clusters, said method  
5 further including presenting said first information, one or more portions of said second  
6 information, and one or more portions of said third information.

1                   11.      A method for inspecting semiconductor wafers comprising:  
2 receiving defect data representative of defects on a semiconductor wafer;  
3 receiving one or more user-provided statistical criteria;  
4 producing one or more sampling criteria based on said statistical criteria;  
5 taking a sample of said defect data based on said sampling criteria to produce  
6 a set of sampled data; and  
7 inspecting each defect on said semiconductor wafer contained in said set of  
8 sampled data to produce review data.

1                   12.      The method of claim 11 wherein said step of receiving one or more  
2 user-provided statistical criteria includes presenting one or more data entry areas to a user and  
3 receiving information from said user indicative of said one or more statistical criteria.

1                   13.      The method of claim 12 wherein said step of presenting includes  
2 producing a graphical user interface on a display, said graphical user interface comprising

one or more graphical elements effective for prompting a user to provide said one or more statistical criteria.

14. The method of claim 11 wherein said one or more statistical criteria include a reliability value, said step of receiving one or more user-provided statistical criteria including presenting a data entry area to a user and receiving data from said user indicative of said reliability value.

15. The method of claim 11 wherein said defect data is further representative of one or more clusters of said defects, said method further including receiving user-provided information representative of one of said one or more clusters, said step of taking a sample being performed on said one of said one or more clusters.

16. The method of claim 11 wherein said review data includes first information representative of clusters of defects on an inspected semiconductor wafer, second information indicative of a major defect mode in each of said clusters, and third information representative of a distribution of each of one or more kinds of defect in each of said clusters, said method further including presenting said first information and said second information, and receiving user-provided information indicative of one of said clusters, and in response thereto presenting a portion of said third information relating to a distribution of each kind of defect in said one of said clusters.

17. The method of claim 16 wherein said presenting said first and second information include presenting images of one or more portions of said inspected semiconductor wafer.

18. The method of claim 16 further including producing review data for a plurality of inspected semiconductor wafer, receiving user-provided information representative of one of said inspected semiconductor wafers, and in response thereto presenting first information of said one of said inspected semiconductor wafers.

19. The method of claim 16 wherein said steps of presenting include producing graphical elements on a display.

20. In a semiconductor wafer inspection system, a method for providing a user interface for making an inspection of a semiconductor wafer, said semiconductor wafer

3 having a plurality of defects, at least some of said defects forming one or more clusters, the  
4 method comprising:

5           presenting one or more first information reception areas for receiving  
6 information relating to statistical criteria;

7           presenting one or more second information reception areas for receiving  
8 information indicative of a selection of one or more of said clusters; and

9           receiving first sampling information or second sampling information,  
10          said first sampling information comprising first statistical criteria,  
11          said second sampling information comprising one or more user-selected  
12 clusters, each user-selected cluster having associated second statistical criteria,

13          wherein if said first sampling information is received, a statistically-based  
14 sampling of first defects from said plurality of defects is made based on said first statistical  
15 criteria and an inspection is made on each of said first defects.

16          wherein if said second sampling information is received, a statistically-based  
17 sampling of second defects from each user-selected cluster is made based on its associated  
18 second statistical criteria and an inspection is made on each of said second defects.

1           21.     In a semiconductor wafer inspection system, a method for providing a  
2 user interface for presenting review information produced from an inspection of one or more  
3 defects taken from a plurality of defects on a semiconductor wafer, at least some of said  
4 defects forming one or more clusters, the method comprising:

5           receiving user-provided information indicative of a selected semiconductor  
6 wafer comprising one of a plurality of semiconductor wafers;

7           presenting first information indicative of said selected semiconductor wafers;  
8           presenting second information indicative of a first set clusters comprising one  
9 or more of said clusters, said second information further indicative of a dominant defect kind  
10 for each cluster in said first set of clusters; and

11          presenting third information indicative of a selected cluster comprising a  
12 cluster in said first set of clusters including information relating to defects comprising said  
13 selected cluster,

14          said second information and said third information comprising portions of said  
15 review information, said review information comprising information of inspections of defects  
16 from a statistically-based sampling of said defects.

1                   22.     The method of claim 21 further including receiving user-provided  
2 information indicative of a second set of clusters comprising one or more of said clusters and  
3 presenting fourth information indicative of said second set of clusters.

1                   23.     In a semiconductor wafer inspection system, a computer program  
2 product for providing a user interface for making an inspection of a semiconductor wafer,  
3 said semiconductor wafer having a plurality of defects, at least some of said defects forming  
4 one or more clusters, the method comprising:

5                   a computer usable medium having computer readable program code;  
6                   said computer readable program code suitable for execution on a computer  
7 and comprising:

8                   first executable program code effective for operating said computer to  
9 present one or more first information reception areas for receiving information relating to  
10 statistical criteria;

11                   second executable program code effective for operating said computer  
12 to present one or more second information reception areas for receiving information  
13 indicative of a selection of one or more of said clusters; and

14                   third executable program code effective for operating said computer to  
15 receive first sampling information or second sampling information,

16                   said first sampling information comprising first statistical criteria,

17                   said second sampling information comprising one or more user-selected  
18 clusters, each user-selected cluster having associated second statistical criteria,

19                   wherein if said first sampling information is received, a statistically-based  
20 sampling of first defects from said plurality of defects is made based on said first statistical  
21 criteria and an inspection is made on each of said first defects.

22                   wherein if said second sampling information is received, a statistically-based  
23 sampling of second defects from each user-selected cluster is made based on its associated  
24 second statistical criteria and an inspection is made on each of said second defects.

1                   24.     In a semiconductor wafer inspection system, a computer program  
2 product for providing a user interface for presenting review information produced from an  
3 inspection of one or more defects taken from a plurality of defects on a semiconductor wafer,  
4 at least some of said defects forming one or more clusters, the method comprising:

5                   a computer usable medium having computer readable program code;

6                   said computer readable program code suitable for execution on a computer  
7   and comprising:  
8                   first executable program code effective for operating said computer to  
9   receive user-provided information indicative of a selected semiconductor wafer comprising  
10   one of a plurality of semiconductor wafers;  
11                   second executable program code effective for operating said computer  
12   to present first information indicative of said selected semiconductor wafers;  
13                   third executable program code effective for operating said computer to  
14   present second information indicative of a first set clusters comprising one or more of said  
15   clusters, said second information further indicative of a dominant defect kind for each cluster  
16   in said first set of clusters; and  
17                   fourth executable program code effective for operating said computer  
18   to present third information indicative of a selected cluster comprising a cluster in said first  
19   set of clusters including information relating to defects comprising said selected cluster,  
20                   said second information and said third information comprising portions of said  
21   review information, said review information comprising information of inspections of defects  
22   from a statistically-based sampling of said defects.

1                   25.     A wafer inspection and review system comprising:  
2                   an inspection apparatus for performing inspections on a semiconductor wafer,  
3   said inspection apparatus producing wafer defect information indicative of defects detected  
4   on said semiconductor wafer;  
5                   a review apparatus for performing additional inspections on said  
6   semiconductor wafer, said review apparatus producing review information indicative of  
7   results of said additional inspections; and  
8                   a sampling function unit operable to produce a statistically-based sample of  
9   defects from said wafer defect information, said additional inspections being made on said  
10   statistically-based sample of defects.

1                   26.     The system of claim 25 further including an input unit configured to  
2   exchange information with a user to obtain user-provided information comprising statistical  
3   criteria, said sampling function unit producing said statistically-based sample of defects based  
4   on said statistical criteria.

1                   27.     The system of claim 26 wherein said statistical criteria include a  
2 reliability value and either an allowable error value or a dominant defect percentage value.

1                   28.     The system of claim 26 wherein said wafer defect information is  
2 further indicative of clusters of said defects on said semiconductor wafer, said user-provided  
3 information further comprising information indicative of one of said clusters, wherein said  
4 statistically-based sample of defects comprise defects from said one of said clusters.

1                   29.     The system of claim 25 wherein said review information includes first  
2 information indicative of clusters of said defects on said semiconductor wafer, second  
3 information indicative of a dominant defect in each of said clusters, and third information  
4 indicative of a distribution of different kinds of defects in each of said clusters, said system  
5 further including an output unit configured to present said first information, one or more  
6 portions of said second information, and one or more portions of said third information.

1                   30.     A semiconductor wafer inspection system comprising:  
2 means for storing defect information relating to a plurality of defects on a  
3 semiconductor wafer;  
4 means for receiving user-provided information including one or more  
5 statistical criteria;  
6 means for producing a sample number (N) based on said one or more  
7 statistical criteria;  
8 means for sampling said defect information to produce N sampled defects; and  
9 means for inspecting each of said sampled defects to produce review  
10 information.

1                   31.     The system of claim 30 wherein said defect information further  
2 includes cluster information relating to one or more clusters of defects on said semiconductor  
3 wafer, said user-provided information including a cluster selection identifying one of said  
4 clusters of defects, said N sampled defects are sampled from defects located in said one of  
5 said clusters of defects.

1                   32.     The system of claim 30 wherein said review information includes first  
2 information representative of clusters of defects on an inspected semiconductor wafer, second  
3 information indicative of a major defect mode in each of said clusters, and third information

4 representative of a distribution of each of one or more kinds of defect in each of said clusters,  
5 said system further including first means for presenting said first information and said second  
6 information, second means for receiving user-provided information indicative of one of said  
7 clusters, and second means presenting, in response to said second means for receiving, a  
8 portion of said third information relating to a distribution of each kind of defect in said one of  
9 said clusters.

1                   33.     The system of claim 32 wherein means for inspecting produces review  
2 data for a plurality of inspected semiconductor wafers, said system further including means  
3 for third means for receiving user-provided information representative of one of said  
4 inspected semiconductor wafers.